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Environmental impact assessment procedures for projects in marine environment – evaluation analysis

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ABSTRACT

Appropriately high level of marine environment protection implies taking the measures of prudence, precaution, reasonable and rational use of marine natural resources, and that is achieved also through the assessment of potential significant negative impacts at the early stage of planning of a particular project. Marine fish and shellfish farms, marine ports, minerals exploitation, shore nourishment, seabed deepening and drying, construction in and at the sea and other projects in marine environment are subject to implementation of environmental impact assessment and screening projects based on environmental reports. The description of main features of technological processes of planned projects and their impact on marine environment constitute an integral part of environmental reports, as technical baselines for assessing potential significant negative impacts. In order to prevent pollution, pursuant to law provisions, it is necessary to apply technologies that are most efficient for achieving high level of marine environment protection. In assessing at the planning stage whether most acceptable technologies are used, consultative expert committee consisting of scientists and professionals is engaged in environmental impact assessment procedures. Paper analyses the parts of environmental reports describing technological procedures and proposes the methods of upgrading their quality by involving experts and scientists in examining thereof.

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1 Introduction

The state of coastal and marine areas undoubtedly reflects the pressure of the ever growing number and intensity of use of such precious space and also demonstrates the fact that the anomalies exist in regulating its use and in assessing environmental impacts of various projects. The Republic of Croatia has by its accession to the European Union assumed the *acquis* also in the sector of environment and in compliance therewith harmonized its regulations. Therefore, legislative framework per se should not present an obstacle for achieving better state in space.

Research concerning the practice and effect of the instrument of environmental impact assessment has unfortunately not been accorded appropriate attention. Such a relationship of science towards said important part of an *ex-ante* procedure with regard to environment greatly contributes to its unsatisfactory state. The authors have

in their previous research been focused on the impact of projects in tourism [1,2]. This paper focuses on the procedure itself, placing particular emphasis on the participants examining the environmental impact report.

Following the analysis of concepts of environmental impact assessment and expertise required for implementing the procedure as set out by the provisions, the early stage of project planning is elaborated. Some examples of the procedures involving projects in marine environment in 2017-2019 period are then presented which had either been the objects of environmental impact assessment (hereinafter: EIA) procedures or screening procedures. The projects involve tuna and white-fleshed fish farms, sea ports, wastewater treatment, coast and beach refurbishing, and gas extraction. Examples of professional merit examination for projects within the framework of EIA and screening procedures are analysed, and proposals are presented for modification and upgrading.

2 EIA instrument and requisite expertise

The procedure of environmental impact assessment is briefly defined by the United Nations Economic Commission for Europe (UNECE) as an assessment of the impacts of a planned activity on the environment [3]. The definition by the International Association for Impact Assessment in 2009 states that it is the process of identifying, predicting, evaluating and mitigating the biophysical, social and other relevant effects of proposed development proposals prior to major decisions being taken and commitments made [4].

The best practice commands for the application of a precautionary principle, i.e. mitigation should be based on the possibility of a significant impact even though there may not be conclusive evidence that it would occur. Similarly, as preventive action is preferable to remedial measures, and environmental damage should be rectified at source, the best mitigation measures involve modifications to project design rather than containment or repair at receptor sites, or compensatory measures such as habitat creation, which should be considered only as the last resort [4].

Therefore EIA procedure should involve a team of experts with profound knowledge of various components, and in many cases also of different aspects of a specific component. At that, close coordination is necessary to avoid duplication of effort and to ensure that important aspects are not omitted, that being particularly important for interlinked components such as soils, geology, air, water and ecology in general, historical and cultural issues, as well as landscape.

The EIA Directive [5] in its preamble states that experts involved in the preparation of environmental impact assessment reports should be qualified and competent and that sufficient expertise, in the relevant field of the project concerned, is required for the purpose of its examination by the competent authorities in order to ensure that the information provided by the developer is complete and of a high level of quality. Article 5 of the Directive lays down that in order to ensure the completeness and quality of the environmental impact assessment report the developer shall ensure that the environmental impact assessment report is prepared by competent experts, while the competent authority shall ensure that it has, or has access as necessary to, sufficient expertise to examine the environmental impact assessment.

3 Early stage of project planning

In order to implement the aforementioned precautionary principle, as well as prudent and rational use of natural resources, certain projects command for environmental impact assessment at an early stage of project planning. That implies examining concept design where potential significant environmental impacts are identified, described and evaluated with regard to soil, water, the sea,

air, forests, climate, people, flora and fauna, natural resources, landscape, material assets, and cultural heritage, taking also into account their interactions.

The assessment of potential environmental impacts is based on the character, size and site of the project, all with the aim of minimizing environmental impact of an intervention and achieve maximum preservation of quality of the environment. That is achieved by aligning and adapting intended project to receptive capacities of the environment in a particular area.

The projects that may have significant impacts on marine environment, and which are subject to compulsory EIA carried out by the Ministry of Environmental Protection and Energy (hereinafter: MEPE) are set out in Annex I of the EIA Regulation (hereinafter: Regulation), some of them being, as enumerated therein [6]: 19. *Sea ports open for public traffic of particular (international) economic interest for the Republic of Croatia and sea ports for special purposes of significance for the Republic of Croatia under lex specialis*; 32. *Waste water treatment plants exceeding 50,000 PEs (population equivalents) with associated sewage system*; 33. *International and backbone pipelines for the transport of gas, oil, oil products and chemicals, including the terminal, dispatch and metering – control (reduction) station that is technologically connected with such pipeline*; 40. *Extraction of hydrocarbons (oil, natural gas, gas condensate and ozokerite), crushed and dimension stone*, and 45. *Marine aquaculture: white-fleshed fish farms in protected coastal area with annual output exceeding 100 t, fish farms outside protected coastal area up to distance of 1 Nm with annual output exceeding 700 t, and fish aquaculture outside protected coastal area at the distance exceeding 1 Nm from island or mainland coast with annual output exceeding 3,500 t*.

The projects assessed with regard to significance of their impact on marine environment for which screening procedure is undertaken by MEPE are defined in Annex II of Regulation, among them being: 1.3. *Marine aquaculture: white-fleshed fish farms in protected coastal area with annual output less than 100 t and fish farms outside protected coastal area with annual output exceeding 100 t*; 3.6. *Shipyards*; 9.11. *Sea ports with more than 100 berths capacity*; 9.12. *All interventions involving sea coast backfilling, deepening and sea bottom draining as well as constructions in and at the sea with length of 50 m and above*; 10.4. *Waste water treatment plants (hereinafter: WWTP) with associated sewage system*; 10.12. *Exploration and other deep drills except drills designated for testing soil stability/geotechnical exploration drills*; 11.1. *Tourist zones with 15 ha area and above outside the limits of construction site of the settlement*, and 13. *Modification of intervention referred to in Annex I and II which could have significant negative impact on environment, whereby significant negative impact on the environment is upon request of the developer evaluated by the Ministry by virtue of an opinion, or under screening procedure*.

The projects which are evaluated in terms of the significance of their impact on marine environment and which are subject to screening procedure undertaken by competent county authority are laid down in Annex III of Regulation, some of them being: 3.4. *Any deliberate drowning of maritime object (vessel, floating unit or fixed offshore unit) aimed at further use, not resulting from marine accident*; 4.2. *Theme parks having an area of 5 ha and above*, 4.3. *Camp-sites and camp-site platforms with an area of 2ha and above* and 6. *For other interventions specified in Annexes II and III which do not attain the criteria laid down in mentioned annexes, and which could have significant impact on the environment, whereby significant impact on the environment is upon request of the developer evaluated by competent administrative body in the county or the City of Zagreb by virtue of an opinion taking into account the criteria referred to in Annex V of the Regulation, or under screening procedure.*

EIA procedure is carried out on the basis of EIA report the contents of which are set out in Annex IV of the Regulation which is examined by advisory-expert committee designated by the Minister of environmental protection and energy.

The screening is carried out on the basis of a screening report whose contents are set out in Annex VII of the Regulation, regarding which the competent authorities are asked to issue opinions on a significance of impact of certain project on a particular component of the environment and significance of load on the environment exerted by a particular project.

Integral part of environmental report or screening report is a conceptual design which comprises textual statement of reasons and graphic view of an undertaking, and mining project for minerals extraction.

4 Examples of procedures concerning the projects in marine environment

4.1 Environmental impact assessment

Analysis is made of 6 projects listed on web page of MEPE [7] for which EIA procedures had been undertaken on the basis of environmental reports and administrative decisions on acceptability for environment issued, subject to application of prescribed environment protection measures and monitoring programmes for state of the environment, stating the authorities involved in the procedures. The list of projects is provided in table 1. The projects considered involve tuna and white-fleshed fish farming under item 45. Sea aquaculture and item 19. Marine ports of Annex 1 to the Regulation.

Tuna and white-fleshed fish farming. The principle of intense tuna and white-fleshed fish cage farming is based on confining the space where tuna and white-fleshed fish are held and in their controlled feeding with the aim of controlling relative farming costs. Concentrating

and holding tuna and white-fleshed fish in a single place, while adding food that is not of autochthonous trophic origin (it is produced outside the place of intervention) may result in a change of category of habitat into habitat with added energy. That process theoretically results in trophic modification of the area of intervention, with particular emphasis on the process of eutrophication of sea bottom. Timely replacement of net cages which should correspond to the speed of fouling of net sinker has an effect on water quality. Appropriate application of zoo technical measures results in avoiding the use of pharmaceuticals on the farm.

Sea ports. The very construction of a sea port requires construction works of drilling and/or excavation of sea bottom, backfilling of significant quantities of stone material that is supplied from another locality to the coast and sea bottom and laying concrete over parts of a port, thereby fully modifying the aspect and composition of the coast and sea ecosystem. During port use the boats, ships and yachts are berthed and artificial coatings from them are released into seawater while discharge of wastewater from the vessel into the sea results in the change of its composition and in introducing of organisms which do not belong there.

4.2 Screening

Analysed in this part are 19 projects that were subject to screening procedure in years 2017, 2018, and 2019, those being the following: wastewater treatment, coast and beach refurbishing, marine ports, marine aquaculture (white-fleshed fish farming) and gas extraction. The information on projects, screening reports and administrative decisions is posted on web page of MEPE [8].

Wastewater treatment. Screening procedures regarding sewage systems and WWTPs were carried out pursuant to item 10.4. *Waste water treatment plants with associated sewage system* listed in Annex II of the Regulation since they range between 150 and 2,263 PEs, or less than 50,000 PEs which would pursuant to item 32 of Annex I of the Regulation imply EIA procedure. With regard to all the three systems (table 2) administrative decision was issued stating that no significant environmental impacts are expected and that it is not necessary to implement the EIA procedure. The basis of the system of collection and purification of wastewater consists of watertight pressure pipelines laid along or within existing roads, pump stations and the control system, as well as of the wastewater treatment plant and outfall. In connection with the project in Bakar bay, which is sited in vulnerable area, the obligation is laid down to apply at minimum the first stage of treatment for the existing wastewater system. With regard to Zaton project, the outfall will consist of land part 130 m long and subsea part 175 m long at the depth of 20 m. Sludge from the plant will be taken away to solar drying at the WWTP Šibenik. In Podselje project, the WWTP of Podselje community is designed in a way that the outfall of treated water at sec-

Table 1 Projects for which EIA procedure was carried out in 2017 and 2018.

Name and year of intervention	County, Municipality/City	Technology	Authorities involved in the procedure	
Tuna fish farm capacity 1,500 t/yr near Balabra island, 2017	Šibenik-Knin County, Municipality of Murter-Kornati	TUNAFISH FARMING	1. Ministry of Environmental Protection and Energy, Directorate for nature protection 2. Ministry of Construction and Physical Planning, Directorate for permits of national importance 3. Ministry of Agriculture, Directorate for fisheries 4. Competent county 5. Competent municipality	1. Hydrographic Institute of the Republic of Croatia 2. Institute of Oceanography and Fisheries
Capacity increase of tuna fish farm located under Mrdina at South-west part of Ugljan island, 2018	Zadar County, Municipality of Kali			
Capacity increase of white-fleshed fish farm along Dugi otok between capes Žman and Gubac to 3000 t/yr, 2017	Zadar County, Municipality of Sali	WHITE-FLESHED FISH FARMING	1. Ministry of Environmental Protection and Energy, Directorate for nature protection 2. Ministry of Construction and Physical Planning, Directorate for permits of national importance 3. Ministry of Agriculture, Directorate for fisheries 4. Competent county 5. Competent municipality	1. Hydrographic Institute of the Republic of Croatia 2. Institute of Oceanography and Fisheries
Capacity increase of white-fleshed fish farm along the island of Galičnjak 640 t/yr in Mljet municipality, 2018	Dubrovnik-Neretva County, Municipality of Mljet			
Extension of marine port open for public traffic in the community of Bol on Brač island, 2017	Split-Dalmatia County, Municipality of Bol	MARINE PORTS	1. Ministry of Environmental Protection and Energy, Directorate for nature protection 2. Ministry of Construction and Physical Planning, Directorate for permits of national importance 3. Ministry of the Sea, Transport and Infrastructure 4. Ministry of Culture 5. Croatian Waters 6. Competent county 7. Competent municipality	
Nautical tourism port Pašman with access road and promenade, 2018	Zadar County, Municipality of Pašman			

Source: MEPE, <https://mzoe.gov.hr/puo-4014/4014>.

Table 2 Cases of screening procedures regarding wastewater treatment projects.

Name and year of intervention	County, Municipality/City	Authorities involved in the procedure
System of water supply and sewerage with pertaining wastewater treatment plant in the City of Bakar, 1,600 PEs, 2017	Primorje-Gorski Kotar County, City of Bakar	1. Ministry of Environmental Protection and Energy: Directorate for nature protection Directorate for climate action, sustainable development and protection of the air, soil and from light pollution Division for waste management Directorate for water management and protection of the sea 2. Competent county 3. Competent city
System of water supply and wastewater treatment plant on the territory of Zaton community, 2,263 PE, 2018	Šibenik-Knin County, City of Šibenik	
Sewerage and wastewater treatment plant of Podselsje community, 150 PEs, 2019	Split-Dalmatia County, City of Vis	

Source: MEPE, <https://mzoe.gov.hr/opuo-4016/4016>.

Table 3 Cases of screening procedure regarding coast/beach refurbishing.

Name and year of intervention	County, municipality/city	Authorities involved in the procedure
Coast refurbishing by Mitani marina in Novi Vinodolski, 2017	Primorje-Gorski Kotar County, City of Novi Vinodolski	1. Ministry of Environmental Protection and Energy: Directorate for nature protection Directorate for water management and protection of the sea 2. Ministry of Culture, Directorate for protection of cultural heritage 3. Competent county 4. Competent city/municipality
Beach/coast refurbishing, reconstruction of coastal plateau and construction of accompanying facilities, 2017	Dubrovnik-Neretva County, Lopud island	
Coast refurbishing in Rogoznica – area of Zatoglav, 2018	Šibenik-Knin County, Municipality of Rogoznica	
Refurbishing of Maslinica beach from Punta towards Tepi bok, 2018	Split-Dalmatia County, Municipality of Šolta	
Refurbishing of Zaratić beach in the area of Jezera community, 2019	Šibenik-Knin County, Municipality of Tisno	

Source: MEPE, <https://mzoe.gov.hr/opuo-4016/4016>.

Table 4 Cases of screening procedures regarding marine ports projects.

Name and year of intervention	County, Municipality/City	Authorities involved in the procedure
Extension of the port open for public traffic Ika, 2017	Primorje-Gorski Kotar County, City of Opatija	1. Ministry of Environmental Protection and Energy: Directorate for nature protection Directorate for climate action, sustainable development and protection of the air, soil and from light pollution Directorate for water management and protection of the sea 2. Ministry of Culture, Directorate for protection of cultural heritage 3. Competent county 4. Competent city/municipality
Reconstruction of nautical tourism port ACI marina Pula, 2017	Istria County, City of Pula	
Nautical tourism port Promajna, 2018	Split-Dalmatia County, Municipality of Baška voda	
Port open for public traffic of local significance Lumbarda – Sutivan bay, 2018	Dubrovnik-Neretva County, Municipality of Lumbarda	
Extension of the port for public traffic Mrtvaška, 2019	Primorje-Gorski Kotar County, Municipality of Mali Lošinj	
Nautical tourism port marina Podgora – local significance, 2019	Split-Dalmatia County, Municipality of Podgora	

Source: MEPE, <https://mzoe.gov.hr/opuo-4016/4016>.

ond stage will be discharged into dry well. It is envisaged that the sludge will be temporarily disposed at the nearest landfill, and subsequently treated pursuant to legislative provisions. Potential significant environmental impacts are not expected from the wastewater collection system, but from treatment in the sense of disposal of remaining sludge from purification and discharge of purified water. The authorities involved in delivering opinions concerning the significance of environmental impact are the MEPE (Directorate for nature protection, Directorate for climate action, sustainable development and protection of the air, soil and from light pollution, Division for sustainable waste management, and Directorate for water management and protection of the sea), competent county and competent municipality.

Coast/beach refurbishing. With regard to five projects listed in table 3, screening procedures have been undertaken pursuant to item 9.12 of Annex II of the Regulation. Administrative decisions were issued for those projects stating that no significant environmental impacts are expected and that it is not necessary to carry out the EIA procedure. It is only with regard to refurbishing of Zaratić beach that the administrative decision issued states that it is necessary to undertake the EIA procedure and appropriate assessment. Basic elements in refurbishing of the coast and beach are replenishing of coastal part with stone material, construction of the key and steps using stone blocks, very often concrete platforms for sunbathing, concrete support walls with stone revetment seawards, rubble mound, construction of concrete stairs for descending into the sea, and the construction of pilots, breakwaters and wharfs. Coast refurbishing in Novi Vinodolski and Rogoznica will be carried out by backfilling stone material brought from other sites, while in Rožanac reinforced concrete wall for additional protection will be built as well. Beach refurbishing at Lopud Island will involve the construction of sunbathing platform from steel elements structure lined with faux timber. The beach at Šolta will be landscaped with concrete surface lined with irregular pieces of local stone. The authorities involved in

issuing the opinion on the significance of environmental impact are MEPE (Directorate for nature protection and Directorate for water management and protection of the sea), the Ministry of Culture where necessary (Directorate for protection of cultural heritage), competent county and/or competent city/municipality.

Marine ports. With regard to six marine ports projects (table 4) the screening procedures were undertaken pursuant to item 9.11. *Sea ports with more than 100 berths capacity* specified in Annex II of the Regulation, those being the ports of local significance. Screening was undertaken also pursuant to item 13 of Annex II of the Regulation, it being the reconstruction and upgrading of the port for public traffic of national and international significance. Construction and reconstruction mainly concerned piers, plateaus, extension or coast replenishment, dredging within port basin for achieving requisite depth to accommodate vessel draft, laying rubble mounds etc. The technology of construction and use of marine ports is described in the part analysing EIA. The authorities involved in issuing the opinion on the scale of environmental impact are MEPE (Directorate for nature protection, Directorate for climate action, sustainable development and protection of the air, soil and from light pollution, and the Directorate for water management and protection of the sea), the Ministry of Culture as necessary (Directorate for protection of cultural heritage), competent county and/or competent city/municipality.

White-fleshed fish farming. With regard to three aquaculture projects (table 5) the screening procedures have been carried out pursuant to item 13 of Annex II of the Regulation, those being project modifications under item 45. Marine aquaculture listed in Annex I of the Regulation. The authorities which were involved in issuing opinions on the significance of environmental impact are MEPE (Directorate for nature protection, Directorate for water management and protection of the sea), the Ministry of Agriculture as necessary (Directorate for fisheries), competent county and/or competent city/municipality.

Table 5 Cases of screening procedures regarding white-fleshed fish farming projects.

Name and year of intervention	County, Municipality/City	Authorities involved in the procedure
White-fleshed fish farm Northwest of Iž island, 2017	Zadar County, maritime demesne	1. Ministry of Environmental Protection and Energy: Directorate for nature protection Directorate for water management and protection of the sea 2. Ministry of Agriculture, Fisheries Directorate 3. Competent county 4. Competent city/municipality
Capacity increase of white-fleshed fish farm from 40 to 85 t/yr near Iž island, 2018	Zadar County, City of Zadar	
Conversion of farming fields 5 and 6 from tuna fish farm into white-fleshed fish farming and relocation of farming zones 1 and 2 at Lavdara farm, 2019	Zadar County, Lavdara island	

Source: MEPE, <https://mzoe.gov.hr/opuo-4016/4016>.

Table 6 Cases of screening procedures regarding gas production projects.

Name and year of intervention	County, Municipality/City	Authorities involved in the procedure
Natural gas extraction from gas field Irena in the area of production field Izabela, 2017	Continental shelf of the Adriatic Sea	1. Ministry of Environmental Protection and Energy: Directorate for nature protection, Directorate for climate action, sustainable development and protection of the air, soil and from light pollution, Division for waste management, Directorate for water management and protection of the sea Directorate for energy 2. Ministry of the Sea, Transport and Infrastructure, Directorate for maritime safety 3. Ministry of Internal Affairs, Fire safety inspectorate 4. Istria County, Administrative department for sustainable development
Drilling and commissioning the fields Ika B duboka, Ika-C, Ilena-2 and Ira-1DIR and the construction of production rigs Ika C, Ilena and Ira at hydrocarbons production field "North Adriatic", 2018		

Source: MEPE, <https://mzoe.gov.hr/opuo-4016/4016>.

Gas extraction. With regard to two projects of gas extraction using gas rigs on continental shelf of the Adriatic Sea (table 6) the screening procedures have been undertaken pursuant to item 13 of Annex II of the Regulation, since they concern modification of the project under item 40 listed in Annex I of the Regulation. Extraction of natural gas from gas field Irena in the area of production field Izabela represents closed production-transport-collection system (from all the new rigs to the existing rig Izabela jug) without discharge of fluid (flowback water) into the sea prior to reaching the existing flowback water treatment system at Izabela jug. Connecting gas pipelines are built from low-alloyed steel pipes laid at sea bottom without fastening, for reducing the impact on sea bottom.

By modification of the project of production field "North Adriatic" it is envisaged to drill and commission the fields Ika B duboka, Ika-C, Ilena-2, Ira-1DIR, to construct production platforms Ika C, Ilena and Ira, as well as to construct submarine junction pipelines from new production rigs to the existing production rigs. In course of mentioned works the most significant impact can be expected from bringing out of the fragments of blast rocks. The drilling fluid circulates through a series of drilling tools, passes through the nozzles of the chisel, and through annular space, delimited by walls of borehole channel and

external surface of drilling tools, returns to the surface. At the surface the drilling fluid flows through the devices of surface system for purification of mud (vibration screens, desanders, desilters, mud cleaners, centrifuges, etc.) by means of which the fragments are separated therefrom, after which purified mud from inlet tank is pumped and again by mud pumps pushed through a series of drilling tools into the borehole, so the process of circulation of drilling fluid proceeds. During drilling, separated fragments of blasted rocks are continuously discharged into the sea. The drilling fluid that may be used is water-based and besides water it also contains additives (barite, bentonite, CMC, etc.) necessary for achieving and regulating the drilling fluid characteristics. The authorities involved in issuing the opinion on the significance of environmental impact are MEPE (Directorate for nature protection, Directorate for climate action, sustainable development and protection of the air, soil and from light pollution, Division for sustainable waste management, Directorate for water management and protection of the sea, and the Directorate for energy), the Ministry of the Sea, Transport and Infrastructure, Directorate for maritime safety, the Ministry of Internal Affairs, Fire safety inspectorate and Istra County, Administrative department for sustainable development.

5 Examining professional merit for projects

5.1 EIA procedure

The projects which command for implementing EIA procedure are evaluated by advisory-expert committee in its opinion. The committee examines environmental acceptability on the basis of EIA report for the intervention and it issues to MEPE or competent administrative authority in the county or the City of Zagreb the opinion on acceptability of the project, proposes possible alternatives with regard to environment and environmental protection measures as well as the monitoring programme for the state of the environment. Furthermore, advisory-expert committee also examines the impact on Natura 2000 network, issues the opinion concerning acceptability of the project therefor, proposes also the mitigation and prevention measures, monitoring method for implementing the measures of mitigation and prevention of significant impact on Natura 2000 sites.

By virtue of the decision of the head of the authority competent for implementing the EIA the composition and membership of advisory-expert committee is defined in accordance with the activity to be undertaken in the facility envisaged by the project. Pursuant to Article 87, paragraphs 5 and 6 of the Environmental Protection Act [9], members of the committee are selected from the list of persons established by the Minister, coming from the ranks of scientists and experts, representatives of authorities and/or persons specified by *lex specialis*, representatives of local and regional self-government units and representatives of MEPE. The list of persons that may be appointed as members of advisory-expert committee is published on web pages of the ministry responsible for environmental protection [10].

Advisory-expert committee attends the sessions that are public in character and takes the decisions by simple majority vote of all its members. Each member is obliged to issue his/her opinion on acceptability of the project and quality of the report in written. A member of advisory-expert committee who is a representative of the body and/or persons designated by *lex specialis* consult with the authority and/or persons they represent, while a member who represents the county and city/municipality is bound to present opinions of executive bodies of a local and regional self-government unit that he/she represents.

Once the advisory-expert committee establishes that the EIA report is complete it examines its professional merit and proposes to competent authority to request its amending if necessary, and if not, it proposes that the report be referred to public consultations.

After the advisory-expert committee receives the response to the comments presented during public consultation, if any, it considers all the documents, states the reasons for accepting or rejecting the project considered and delivers its opinion on its environmental acceptability.

Appointed to the advisory-expert committees for the projects concerning tuna fish farm with capacity 1,500

t/yr near island Balabra in 2017, capacity increase of tuna fish farm located under Mrđina at South-west part of Ugljan island in 2018, and capacity increase of white-fleshed fish farm along the island of Galičnjak 640 t/yr in the Municipality of Mljet in 2018, pursuant to information on interventions posted on web pages of MEPE [11, 12, 13] are the representatives of MEPE – Directorate for nature protection, the Ministry of Construction and Physical Planning – Directorate for permits of national significance, the Ministry of Agriculture – Directorate for fisheries, competent counties and competent municipalities.

With regard to the project of capacity increase of white-fleshed fish farm along Dugi otok between capes Žman and Gubac, to 3000 t/yr in 2017, appointed as members of advisory-expert committee have been the representatives of MEPE – Directorate for nature protection, Ministry of Construction and Physical Planning – Directorate for permits of national significance, Ministry of Agriculture – Directorate for fisheries, Zadar County and Municipality of Sali, or representatives of the authorities as in previous procedures [14]. It is only in this procedure concerning marine aquaculture that experts have also been appointed as well, precisely from the Hydrographic Institute of the Republic of Croatia and the Institute of Oceanography and Fisheries.

It is evident from the aforesaid that frequently missing is the appointment of members from the ranks of experts and/or scientists to advisory-expert committees. The advisory-expert committees thus appointed are not only inadequate for examining the reports as expert baselines, but they are also not in compliance with regulatory provisions.

5.2 Screening procedure

With regard to projects for which it is necessary to undertake the screening procedure, competent authority pursuant to Article 24, paragraph 1 of the Regulation, on the basis of specific examinations under criteria set out in Annex V of the Regulation, establishes whether the intervention may have significant impacts on the environment and decides on the necessity of implementing the EIA procedure.

Depending on site and characteristics of the project, pursuant to Article 26 of the Regulation, competent authority is obliged to seek opinions from the authorities and/or persons set out under *lex specialis* and/or local and regional self-government units concerning significance of the impact on component of the environment or load on the environment falling within the scope of their competence. Once the competent body excludes the possibility of significant environmental impact pursuant to opinions received, it issues the administrative decision establishing that it is not necessary to implement EIA procedure concerning the intervention.

In the procedure of establishing significance of environmental impact, only competent bodies listed in the ap-

plication notice posted on web pages of MEPE may take participation, as specified in tables 2, 3, 4, 5, and 6.

With regard to all the projects specified in mentioned tables, the opinion concerning the significance of impact on nature is issued by the Directorate for nature protection, while for the impact on water and the sea it is issued by the Directorate for water management and protection of the sea. Both directorates make part of MEPE. The opinion is also sought from competent county and city/municipality with regard to planned project. Where the city/municipality is the developer, it is then not called upon to issue its opinion. Other authorities listed in the tables issue opinions depending on the project type concerned.

With regard to all the projects listed in tables 2, 3, 4, 5, and 6, except for Refurbishing of Zaratić beach in the area of Jezera community, 2019, the administrative decisions were issued stating that it is not necessary to carry out EIA procedure, since no significant environmental impacts have been established. The statement of reasons in item I of the administrative decision reads that MEPE on the basis of opinions of competent bodies, and pursuant to criteria under Annex V of the Regulation appraised that planned project will not have significant environmental impact.

The criteria establishing whether the project should be subject to EIA, or on the basis of which the decision on the necessity of undertaking EIA procedure is taken (Annex V of the Regulation) concern the following:

- **characteristics of the project** (size, cumulation with other existing and/or approved projects, the use of natural resources, in particular land, soil, water and biodiversity, the production of waste, pollution and nuisances, the risk of major accidents, the disasters caused by climate change in accordance with scientific knowledge, the risks to human health – for example due to water contamination or air pollution);
- **location of the project** (current land use, quality and regenerative capacity of natural resources in the area, absorption capacity of natural environment, paying particular attention to wetlands, coastal zones, mountain and forest areas, protected areas of nature, areas in which failure to meet the environmental quality standards already occurred, densely populated areas, landscapes and sites of historical, cultural or archaeological significance);
- **nature and type of potential impact of the project** (the magnitude and spatial extent of the impact such as geographical area and size of the population likely to be affected, nature of the impact, intensity and complexity of the impact, expected onset, duration, frequency and reversibility of the impact, cumulation of impact with the impact of other existing and/or approved projects, the possibility of effectively reducing the impact).

From the criteria enumerated on the basis of which it should be decided about the significance of impact it

results that in all screening procedures the participation should also be taken by the authorities whose competence is related to a. project location – the Ministry of Construction and Physical Planning, b. climate change – Directorate for climate action, sustainable development and protection of the air, soil and from light pollution, and c. cumulation with the impact of other existing and/or approved projects – developers of approved and existing projects.

6 Proposals for modification

The List of institutions/persons eligible for appointment as members to the committee for strategic environmental assessment and environmental impact *assessment procedures* [10] posted on web page of MEPE has obvious flaws such as for instance the list of ministries with no indication of names of persons to be appointed as members of the advisory-expert committee. Furthermore, mentioned list is not updated, indicating the names of persons who may no more be appointed as members of advisory-expert committee either due to retirement or change of a workpost. It would be necessary to regularly update and amend the list with experts and scientists of appropriate profiles. Thus the participation of a wide circle of experts from interdisciplinary and monodisciplinary fields which nowadays evolve in an accelerated manner would be ensured, in the same way as technologies to be applied develop.

Since the EIA procedure must provide for implementation of the precautionary principle which pursuant to Article 10 of the Environmental Protection Act implies that in using environmental services the best available techniques should be used as well as globally recognized systems of plant maintenance, the experts that are reliably known to pursue such technology and have knowledge thereof should for the most part be appointed to the ranks of the advisory-expert committee.

In order to provide for amending the list, the experts and scientists themselves should get involved through their active engagement or through own proposals for amending the list.

Another method of major involvement of experts and scientists in examining the acceptability of projects for the environment and quality of the report could be by introducing the system of auditors, as is the case in some European countries. In fact, instituting the auditing of certain projects, although not related to EIA procedures, but to environmental permits and safety reports, was provided for by Articles 41 and 42 of the former Environmental Protection Act of 2007 [15] that is no longer in force. The system of auditors has however never been introduced to audit the projects with regard to environmental protection aspect and the very idea was abandoned upon adopting the new 2013 Act. In order to reintroduce the auditors it would be necessary to amend the Environmental Protection Act.

The administrative decisions issued by MEPE establishing that for a particular project it is not necessary to carry out the EIA procedure pursuant to Article 4, paragraph 5 of Directive 2014/52/EU [16] must state main reasons why the assessment is not required, along with reference to respective criteria set out in Annex V of the Regulation. Appropriate application of criteria set out in Annex V of the Regulation by itself commands for participation of a larger number of competent authorities than is now the case. The selection of competent authorities from which the opinion is sought should therefore not depend solely on the will and knowledge of a public servant who administers the procedure. The decisions on which authorities should be involved in the screening procedure is conditional upon the application of defined criteria. It is solely in that way that involvement of relevant authorities mostly concerned by a specific project shall be safeguarded.

7 Conclusion

Environmental impact assessment of a project is the procedure that identifies, describes and assesses, at an early stage of a project, possible significant environmental impact, meaning the impact on soil, water, sea, air, forest, climate, human beings, flora and fauna, natural values, landscape, material assets, cultural heritage, while taking into account their mutual interactions. When carried out appropriately, it contributes to a high level of environmental and human health protection.

Since in policy making the issues such as sustainable development, biodiversity protection, climate change as well as the risks from accidents and disasters are becoming ever more important, they consequently also constitute important elements in environmental impact assessment procedures, on the basis of which decisions are taken regarding acceptability of a particular project for the environment.

In order to achieve the highest standard of environmental protection, or the implementation of precautionary principle, the application of best available techniques and globally recognized systems of plants maintenance, more effective involvement of experts and scientists in the procedure of examining the projects based on environmental reports is proposed in the paper, whereby one of the options is introducing auditors.

Furthermore, on the occasion of evaluating the need to carry out the environmental impact assessment based on the screening report, the authors propose the involvement of a larger number of competent authorities and also developers of approved and existing projects as well as introducing the criteria for determining thereof. In such a way the criteria on the basis of which decisions on the significance of negative impacts on the environment and of acceptability of a project at particular site are taken would be utilized more soundly.

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